Comparative Performance of Acoustic- and PIT-tagged Fall Chinook Salmon

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Objectives

- Determine if travel times differ between fish implanted with JSATS acoustic transmitters and fish implanted with PIT tags

- Determine if survival differs between fish implanted with JSATS acoustic transmitters and fish implanted with PIT tags

Methods overview

Detection efficiencies of inriver migrants to Snake River dams and McNary Dam

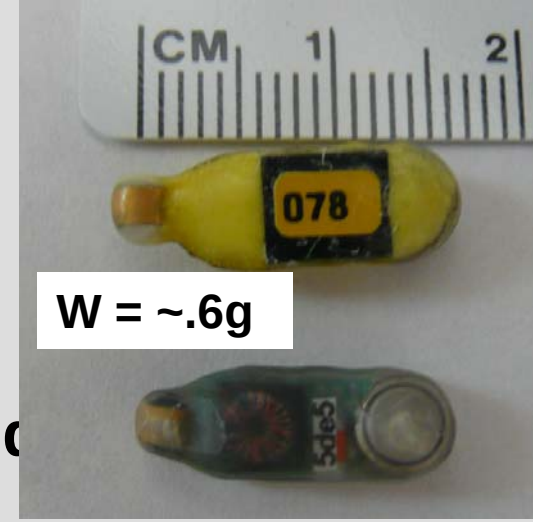
Travel time of inriver migrants to Snake River dams and McNary Dam

Survival of inriver migrants to Snake River dams and McNary Dam

Comparison with laboratory work

Put results in perspective with other JSATS work on subyearling Chinook salmon

Methods



Field Studies:

Implantation of Acoustic transmitters and
9839 subyearling fall Chinook salmon
Released on 27 days between June 4 and July 13

2,092 fish < 95 mm
7,739 fish ≥ 95 mm – focus of today's talk

Mean length 106 mm (range 95 – 146)
Mean weight 13 g (range 6 – 43)
Mean AT tag burden 4.7% (range 1.4 – 9.4)

Matched with 26,112 PIT tagged fish ≥ 95 mm

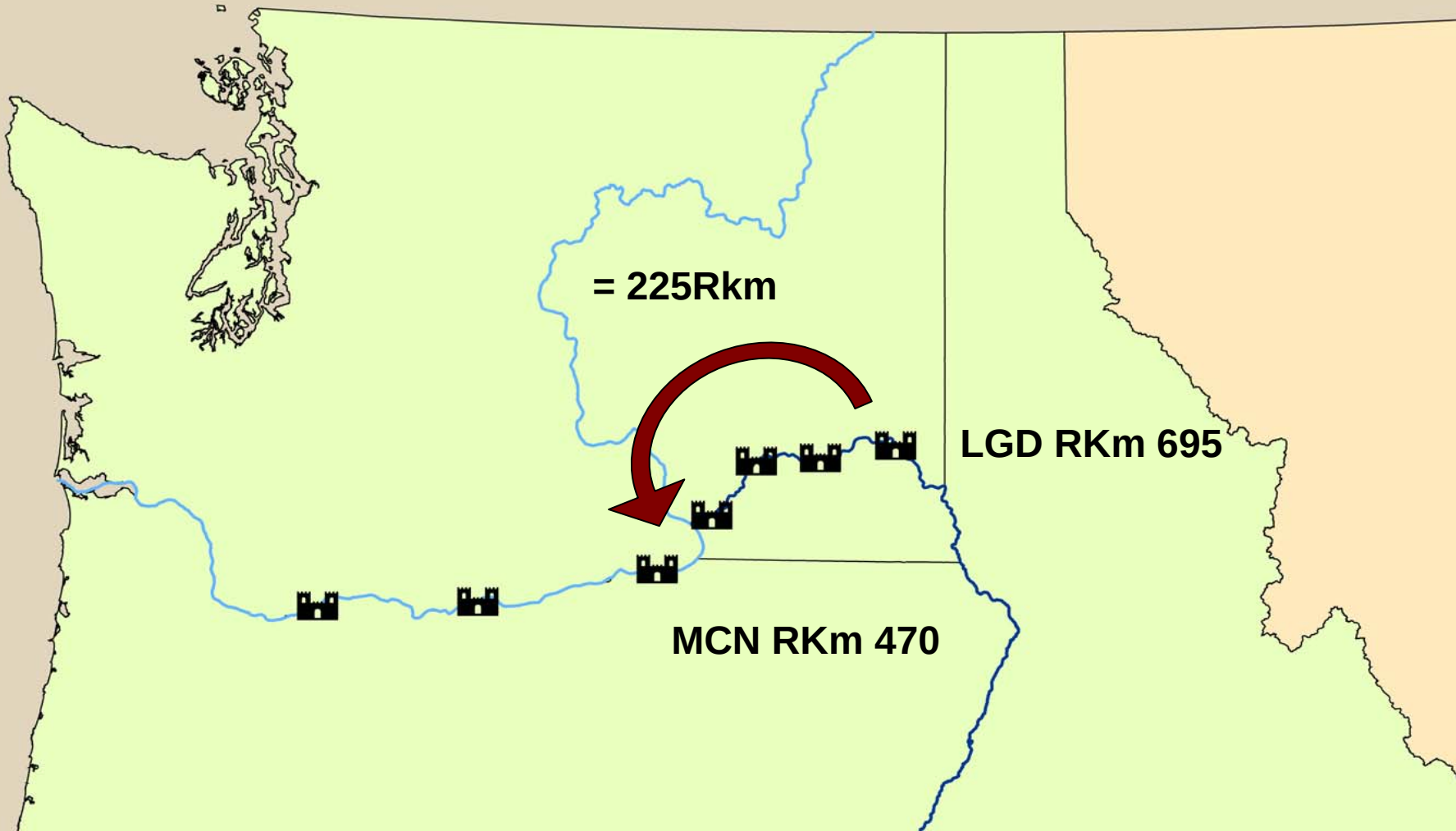
Laboratory Studies:

Transported to Bonneville Dam on 9 dates between June 4 and July 13

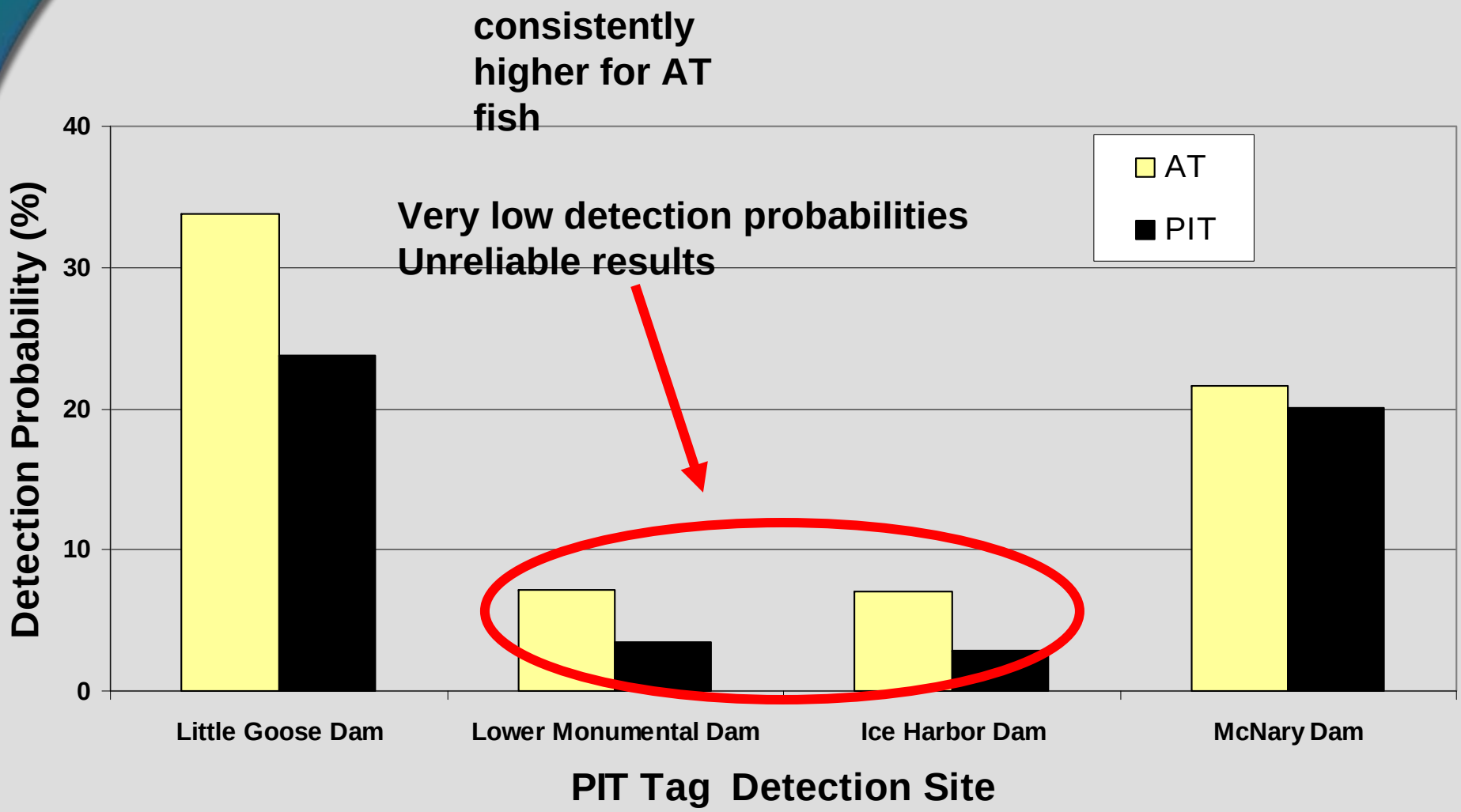
40 fish < 95 mm AT & PIT
40 fish ≥ 95 mm AT & PIT
40 fish ≥ 95 mm PIT
40 fish ≥ 95 mm control

Held for 90 days before necropsy
Transitioned to salt water after 14 days

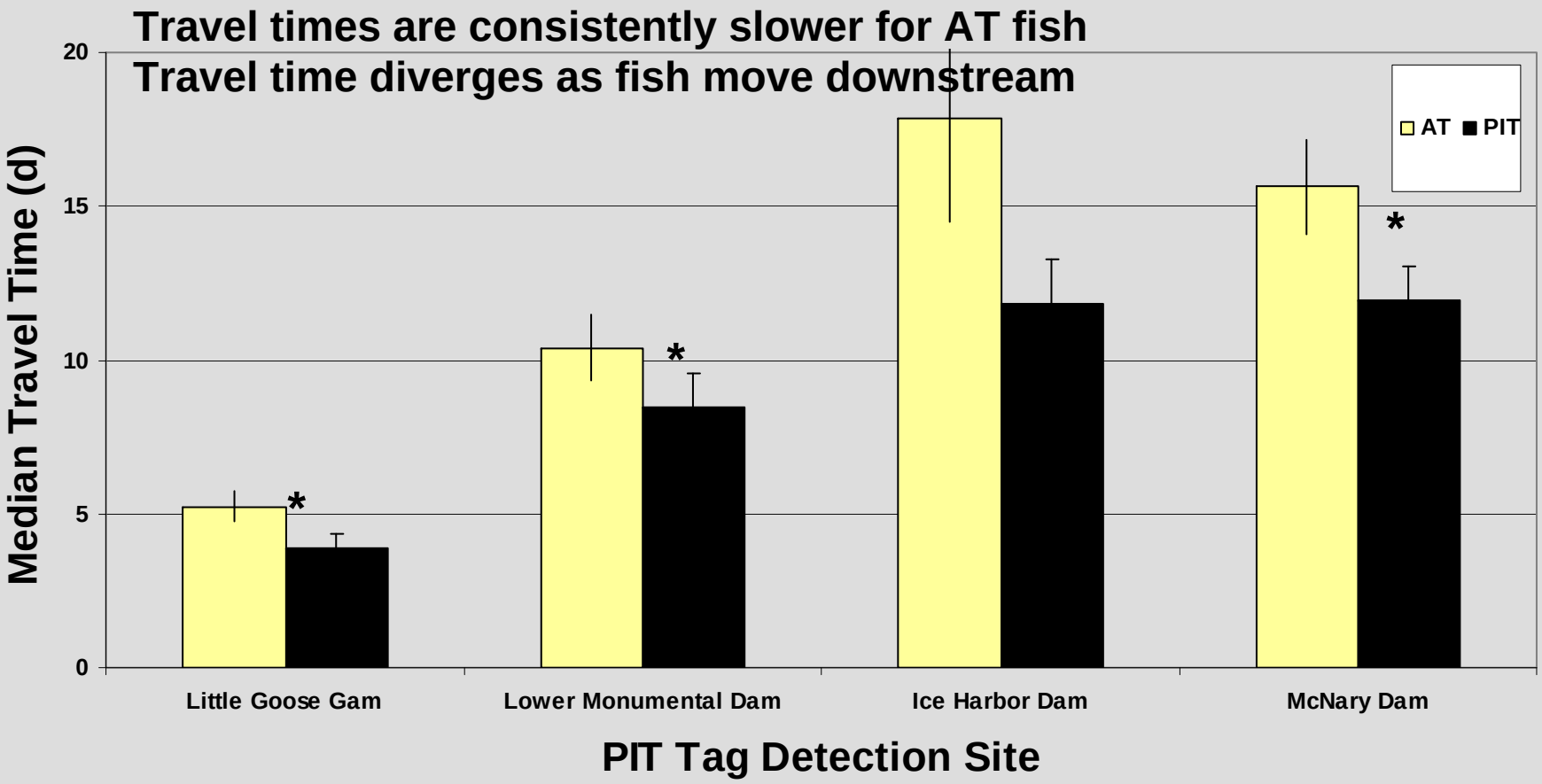
Survival and travel time of subyearling Chinook salmon was examined from Lower Granite Dam to McNary Dam



Detection probability of PIT tags in test groups at downstream PIT tag detection sites

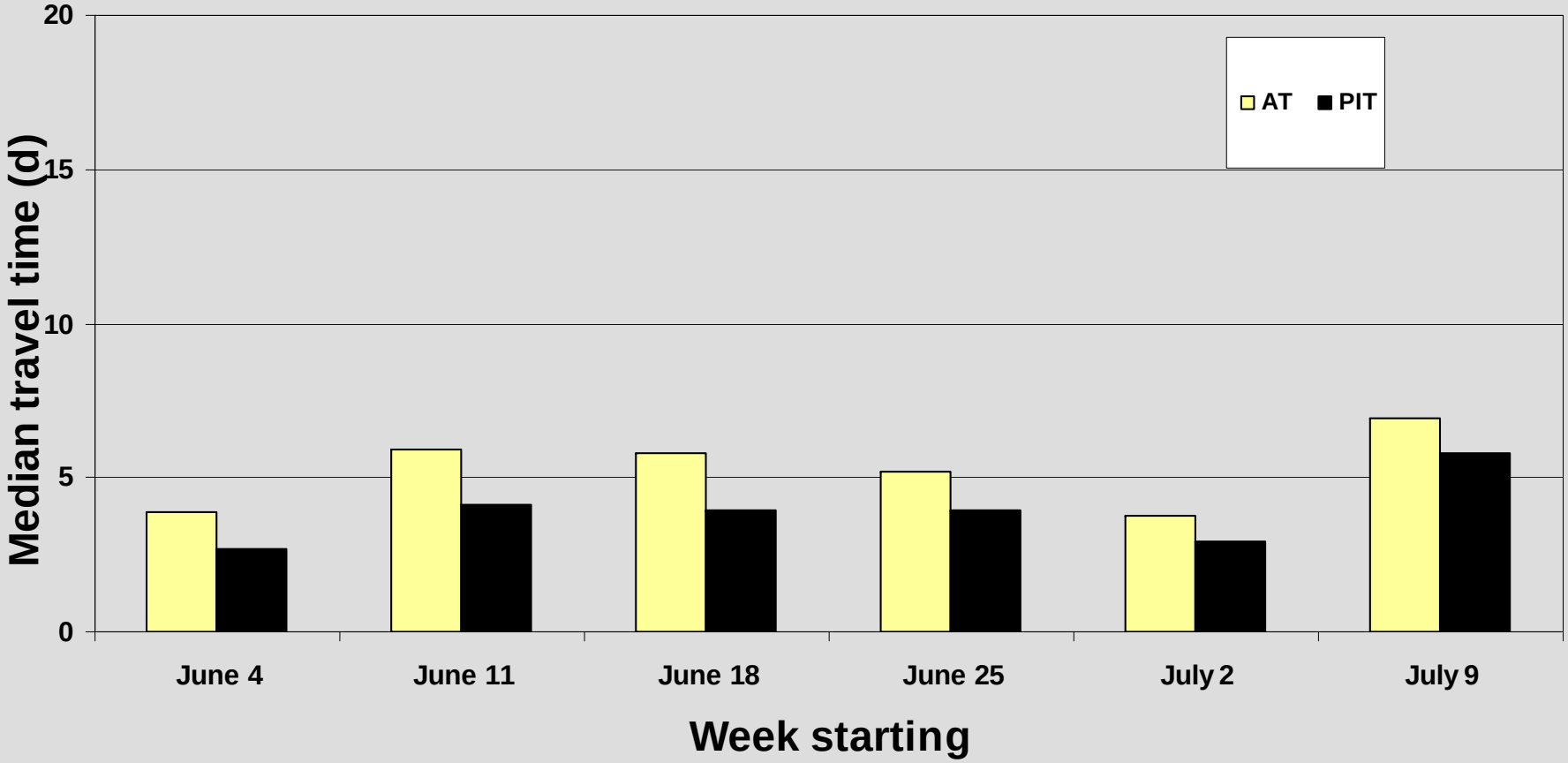


Mean Fall Chinook Inriver Travel Time* From Release To Downstream PIT Tag Detection Sites



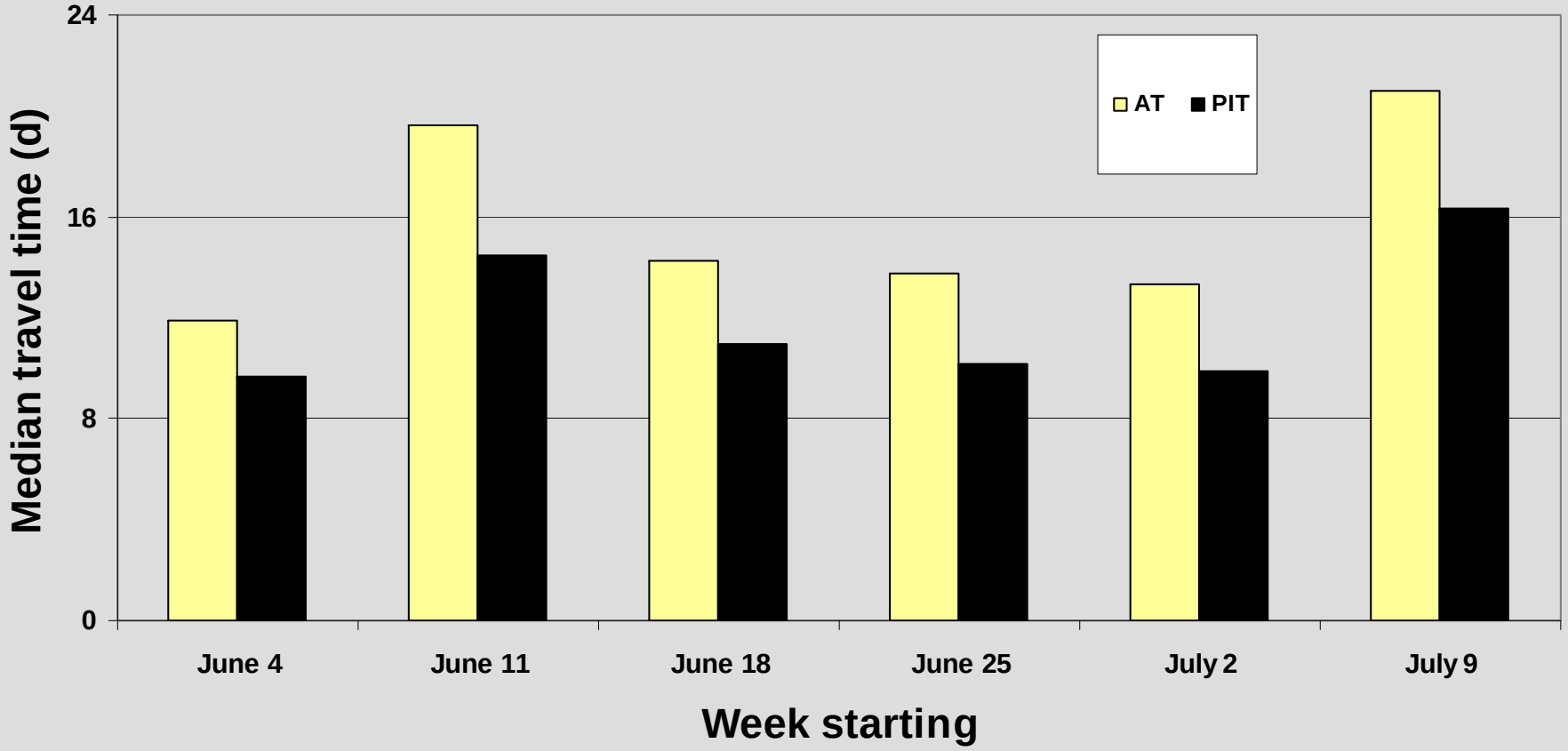
*Preliminary estimates

Fall Chinook Inriver Travel Time* From Release To Little Goose Dam



*Preliminary estimates

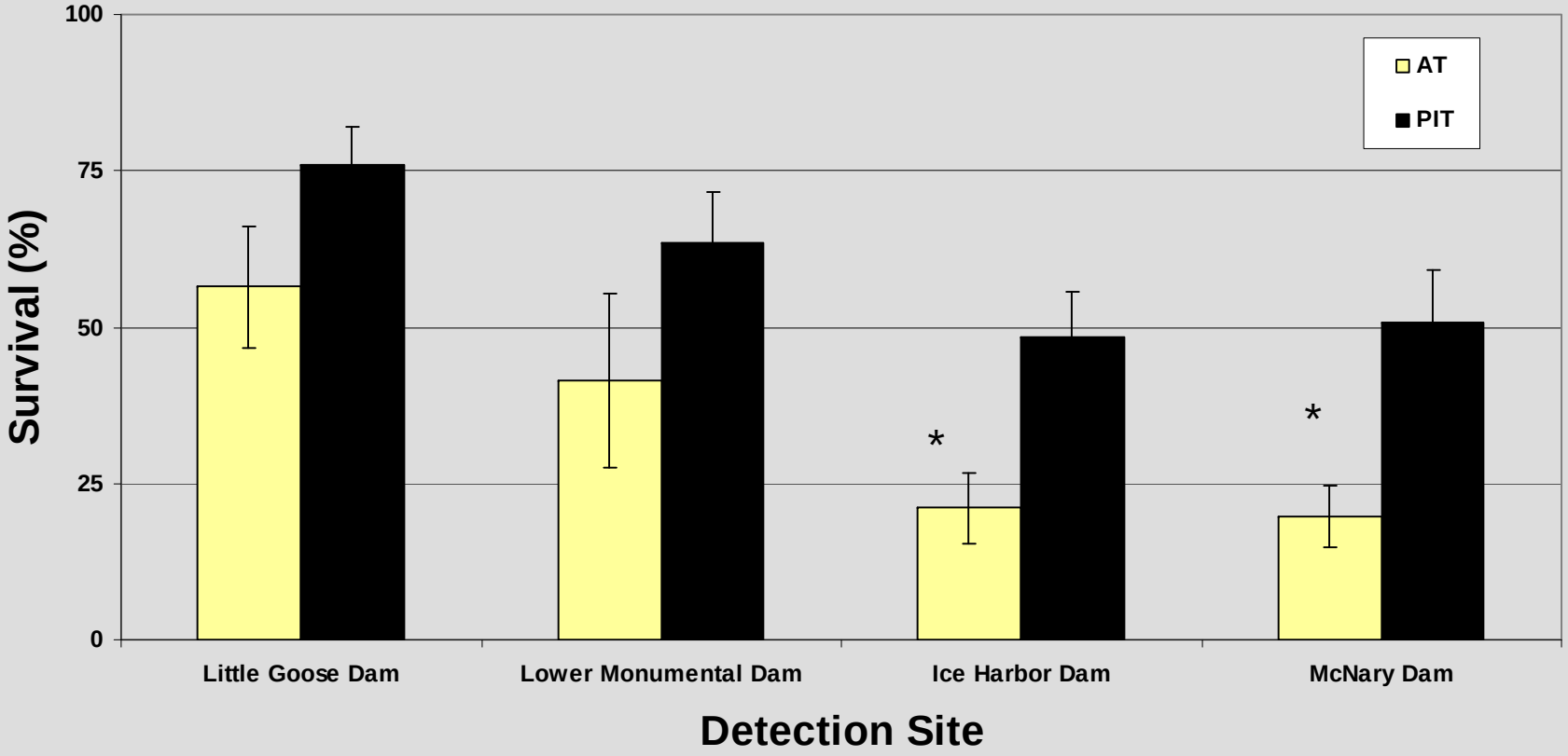
Fall Chinook Inriver Travel Time* From Release To McNary Dam



*Preliminary estimates

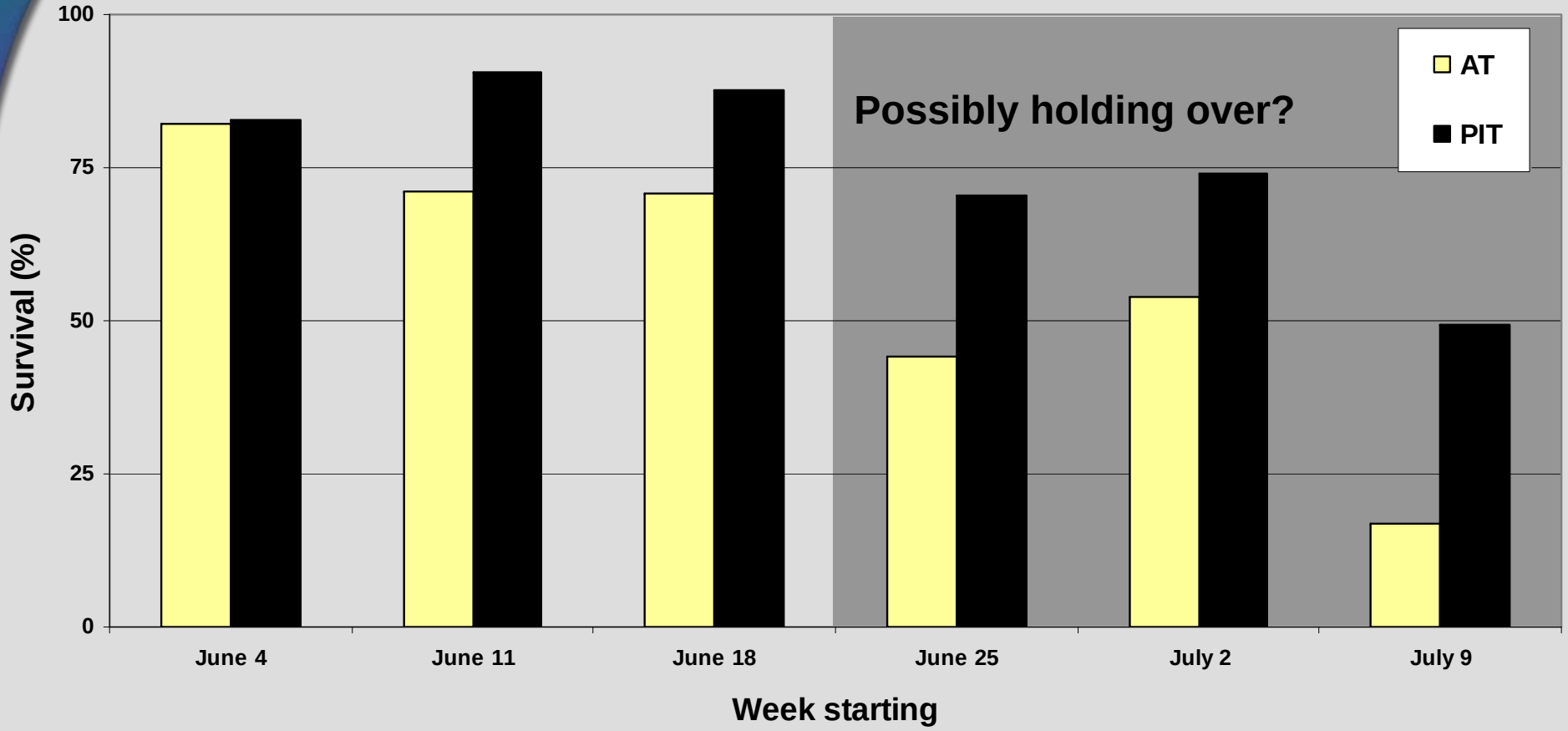
Mean Fall Chinook Inriver Survival* From Release To Downstream PIT Tag Detection Site

The tag effect increases with distance downstream and is significant at Ice Harbor and McNary Dams



* Preliminary survival estimates – final estimates will be prepared by NOAA Fisheries

Mean Fall Chinook Inriver Survival* From Release To Little Goose



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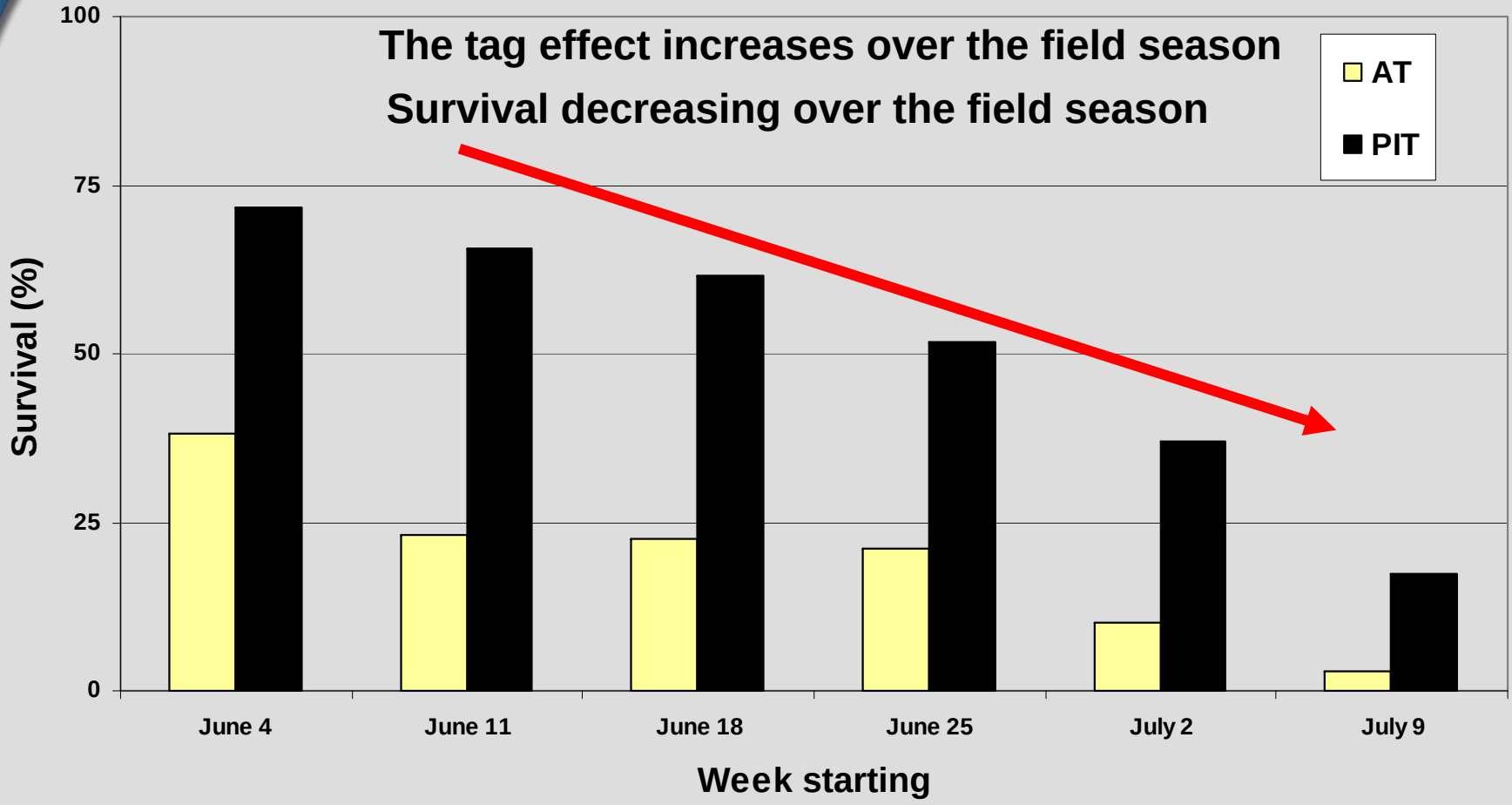
Mean Fall Chinook Inriver Survival* From Release To McNary Dam



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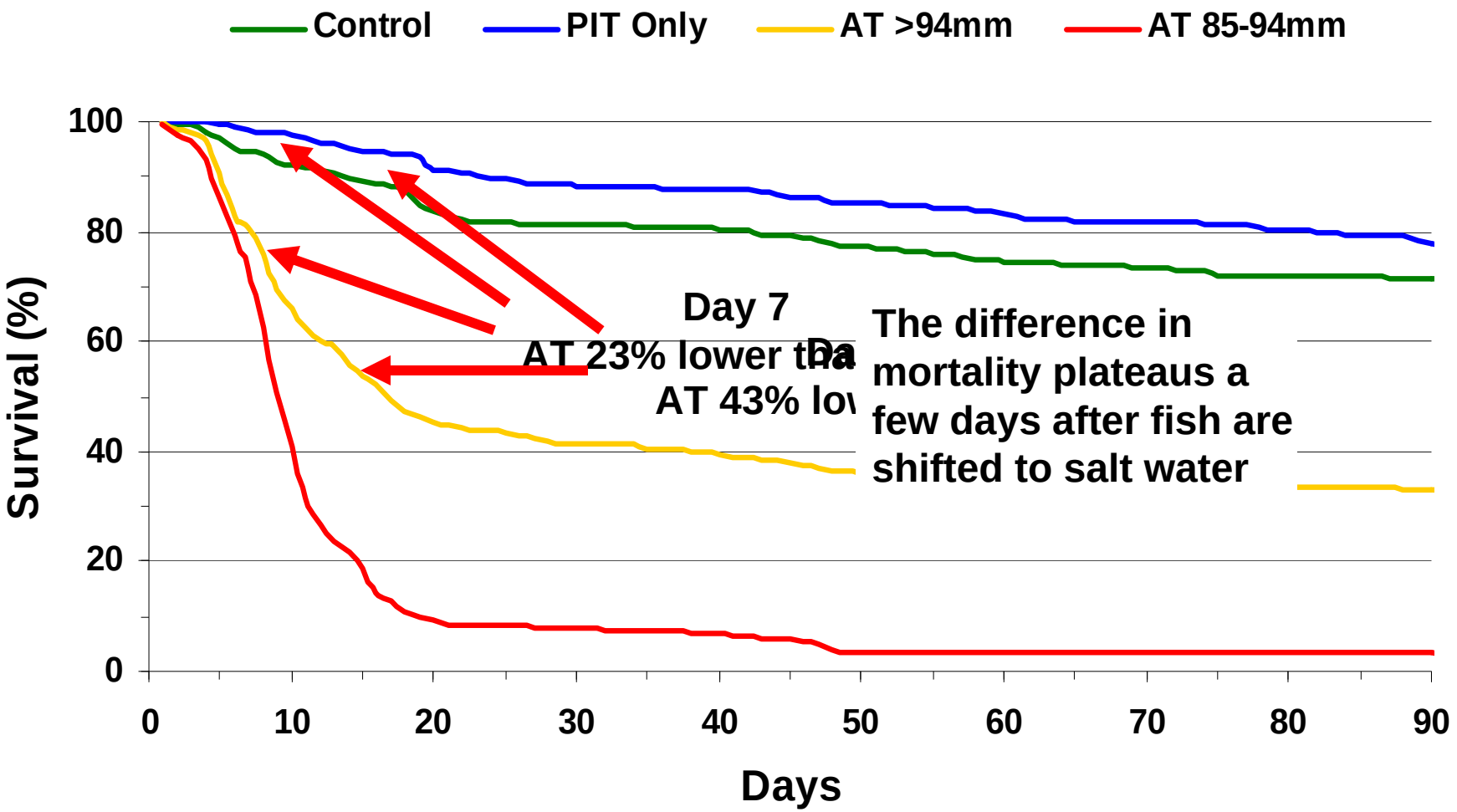
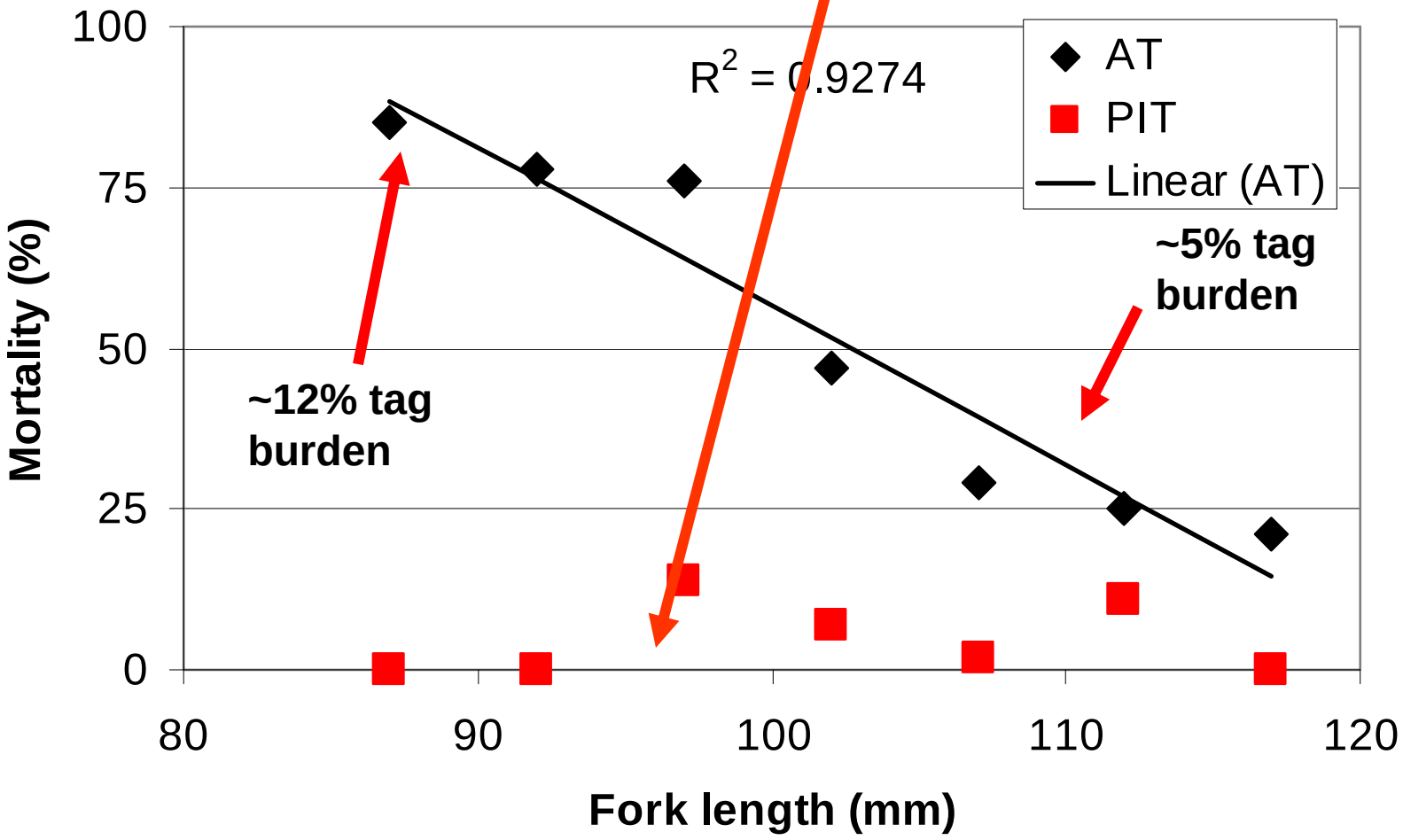
Tag Effects Study 2007 - Subyearling Chinook Salmon
90-Day Survival in Holding



2006 laboratory work found no difference in survival and growth between PIT and AT hatchery reared fish >94mm

Relat



Conclusions

Travel Time

Travel time was slower for AT than PIT fish

Travel times for the two groups diverge as fish travel downstream

Conclusions

Survival

There was a significant tag effect within fall Chinook salmon at Ice Harbor and McNary Dams – no sig. diff. upstream

There were temporal differences in survival between groups

- Less difference earlier in the season
- The tag effect increases over the season as temperatures increase

Survival decreased over the field season for PIT and AT fish

- Likely fish holding over

Conclusions

Survival of fall Chinook salmon implanted with JSATS transmitters much lower during this study than other survival studies using JSATS

70 – 80 % survival to Little Goose (60 km) during June 2007
20 – 40 % survival to McNary Dam (225 km) during June 2007

> 95% survival from Little Goose to Lower Monumental Dam (~45km) in June 2006

> 90% survival in the ~225 km below Bonneville Dam during June 2007

>83% survival from Bonneville Dam to the estuary (225 km) during June 2006

Why the big difference? Further research is needed.

FY 08 Activities

Continue lab work to determine:

How much of the tag effect is due to the presence of the transmitter

How much due to tagging process

use sham tagged (incision + PIT tag) groups

test groups with smaller transmitters

The Bottom Line

We need to understand what the limitations of the technology are.

Based on 2007 Tagging Effects research – tag burdens close to 5% showed negative effects on performance/behavior of subyearling salmon after about 2 weeks

Tags will be smaller – we need to continue to improve our understanding of the limitations of the technology – so we can use this technology to address data gaps in the Columbia Basin

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